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Canadian Forestry Service-Maritimes
TECHNICAL NOTE

MULTI-AGENCY PLANTATION PEST SURVEYS IN NEW BRUNSWICK IN 1986

As no man is an island, no organization alone can be solely responsible to look after the health of the ever-increasing number of plantations. Realizing this, joint federal-provincial-industrial plantation pest assessment surveys have been initiated in New Brunswick. In 1986, 139 plantations were assessed, involving some 11 000 trees of which over 90% were found to be healthy.

Aside from considerable financial investment, forest plantations are as well an investment in the future. It is from plantations that much of the wood needed shortly after the turn of the century will come. Insects and diseases pose the greatest threat to the orderly development of plantations. Protecting them against damage is of utmost importance if the expectations are to be realized.

A special survey method was designed to detect pests and assess the health of plantations. The method was designed to allow staff of cooperating agencies to carry out field assessment and sampling on a large scale without requiring a great deal of expertise in the recognition and knowledge of specific insects and diseases. These surveys are preliminary and plantations with pest problems, considered to be in need of protection, must be subjected to more detailed assessment before action is taken.

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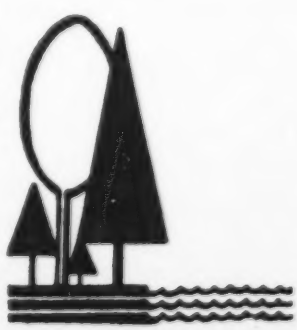

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The plantation assessment in 1986 involved the New Brunswick Department of Natural Resources and Energy (DNRE), J.D. Irving Ltd., Fraser Inc., and the Forest Insect and Disease Survey (FIDS) of the Canadian Forestry Service. Field work was done by provincial or industrial personnel, 80 plantations assessed by DNRE, 52 by J.D. Irving Ltd. and 7 by Fraser Inc. Assessment included detailed examination of all parts of 50 trees in each of the 139 plantations. Trees were selected in a prescribed manner to provide for a good representation of conditions. The majority (59% of the plantations) were assessed twice to maximize the detection of pests present during different times of the season. There were 95 spruce and 44 pine plantations assessed. Sample identification and analysis were the responsibility of FIDS.

The results of the survey are presented here in a series of tables, organized to show the various conditions in spruce and pine plantations in the five DNRE regions. The following comments are offered to summarize the situation as observed in 1986:

1. The most remarkable - and comforting - observation drawn is that, in spite of a long list of orgamisms encountered, plantations of both spruce and pine were found to be generally in very good condition. An average of over 92% of both spruce and pine trees were classified as healthy.

2. Only 1.1% of the pine and 2.4% of the spruce trees were dead. Tree mortality ranged from 0.3% of pine in DNRE Region 1 to 3.4% of spruce in DNRE Region 5.

3. The presence of current defoliation was extremely variable among regions, ranging from 73% on spruce in DNRE Region 5 to only 8% on pine in DNRE Region 1. The level of defoliation was mostly trace with moderate or severe defoliation observed on less than 1% of the trees assessed.

4. Needle diseases, mostly needle rusts, were common, but with the exception of DNRE Region 3, only occasionally reached light intensity. Jack pine needle rust was at the highest levels in the Province in DNRE Region 3.

5. Buds were healthy on 98% of the pine and 87% of spruce trees with little variation in this condition throughout the Province.

6. Leaders were healthy on 90 and 79% of pine and spruce, respectively and less than 2% were dead on either species.

7. Multiple leaders were reported on 9.2% of pine and 16.5% of spruce trees in the Province. Regional variation, ranging from 3 to 18% on pine and 2 to 23% on spruce, may have been the result of sampling bias.

8. Branch, stem and root damage was reported for both pine and spruce but the level of damage was generally low. The exception was jack pine in DNRE Region 3 where 13% of the branches were damaged, probably by combination of globose gall rust and the northern pitch twig moth.

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Table 1. Summary of plantations assessed by tree species in pine and spruce plantations in New Brunswick in 1986.

Tree species	Number of plantations asessed in the various DNRE Regions					
	1	2	3	4	5	Total
Black spruce	10	4	10	6	29	59
Norway spruce	-	-	1	-	2	3
White spruce	2	1	4	1	18	26
Spruce (unspecified)	3	-	2	-	2	7
Jack pine	9	6	16	7	4	42
Red pine	-	-	-	-	1	1
Pine (unspecified)	1	-	-	-	-	1
Totals	25	11	33	14	56	139

Table 2. Plantation problems observed during the plantation assessment survey in New Brunswick in 1986.

	Number of plantations with the problem in the various DNRE Regions									
	Spruce					Pine				
Plantation problems	1	2	3	4	5	1	2	3	4	5
Abiotic injury	10	3	9	7	17	1	3	9	4	2
Ants					1					
Animal damage			3	2	2	2		11	2	
Armillaria root rot	1	1	2	1	22	2			1	1
Bark beetles					1					
Bud moth(s)			1		10					
Budworms	8	3	10	4	44	2	3	10	1	2
Coneworms			2		4				1	1
Conifer aphids	3	4	6		23	3	3	8	1	2
Conifer loopers		1			2	1				
Frost damage	6	2	7	6	23					
Frost heaving				2	1				2	
Globose gall rust							1	5		
Jack pine tip beetles								1		
Mites					1	2	3	1	3	3
Needle cast								1		
Needle rust(s) and cone rust	1		5		16	4	3	13	3	2
Needle tiers					1					
Noctuids (climbing cutworms, owlet moths and spruce harlequin)					4			1		
North pitch twig moth						4	1	9	2	1
Sawflies				1	1	1				
Sawyer beetles	1									
Snow damage				1					2	
Spittle bugs					10					1
Spruce adelgids	1		1	2	23					
Spruce bud midge					1					
Spruce bud scale		1		1	3					
Spruce needleminers	2				2					
Sweetfern blister rust							1			
Tussock moth(s)					1					1
Weevils	2		1	3	3	1		2	3	
Yellow witches broom					1					

Table 3. The condition of trees in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various condition categories(%)		
	Healthy	Damaged	Dead
Pine			
1	95.3	4.4	0.3
2	92.0	7.3	0.7
3	87.3	11.0	1.7
4	95.3	4.2	0.5
5	95.3	2.5	2.2
Average	92.3	6.6	1.1
Spruce			
1	94.8	4.4	0.8
2	83.6	16.2	0.2
3	86.1	12.9	1.0
4	92.2	6.5	1.3
5	94.3	2.3	3.4
Average	92.6	5.0	2.4

Table 4. Defoliation caused by various insects in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various defoliation categories(%)				
	Negative 0%	Trace 1-5 %	Light 6-29%	Moderate 30-70%	Severe 71-100%
Pine					
1	88.6	10.9	0.0	0.5	0.0
2	81.5	18.5	0.0	0.0	0.0
3	53.7	45.7	0.6	0.0	0.0
4	91.6	8.4	0.0	0.0	0.0
5	36.6	63.0	0.4	0.0	0.0
Average	69.6	30.0	0.3	0.1	0.0
Spruce					
1	78.5	15.6	5.8	0.1	0.0
2	72.7	26.9	0.4	0.0	0.0
3	73.1	24.0	2.7	0.2	0.0
4	70.1	27.5	2.4	0.0	0.0
5	22.4	75.7	1.5	0.4	<0.1
Average	43.2	54.1	2.3	0.4	<0.1

Table 5. Foliage damage caused by various needle diseases in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various damage categories(%)				
	Negative 0%	Trace 1-5 %	Light 6-29%	Moderate 30-70%	Severe 71-100%
Pine					
1	84.9	14.7	0.1	0.3	0.0
2	94.5	5.1	0.2	0.2	0.0
3	36.6	43.1	9.8	9.0	1.5
4	82.1	14.3	1.8	1.8	0.0
5	86.7	13.3	0.0	0.0	0.0
Average	71.3	21.7	3.4	3.2	0.4
Spruce					
1	93.6	5.6	0.7	0.1	0.0
2	99.6	0.4	0.0	0.0	0.0
3	71.5	21.3	6.7	0.5	0.0
4	96.8	3.0	0.0	0.2	0.0
5	88.2	11.4	0.4	<0.1	0.0
Average	88.2	10.6	1.2	<0.1	0.0

Table 6. Foliage affected by various abiotic conditions in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various defoliation categories(%)				
	Negative 0%	Trace 1-5 %	Light 6-29%	Moderate 30-70%	Severe 71-100%
Pine					
1	96.4	2.4	1.1	0.0	0.1
2	96.8	2.8	0.4	0.0	0.0
3	78.0	17.6	1.4	1.4	1.6
4	86.1	9.9	1.8	2.0	0.2
5	13.8	85.1	0.9	0.2	0.0
Average	77.6	19.9	1.1	0.8	0.6
Spruce					
1	85.1	11.7	2.0	0.9	0.3
2	98.5	1.3	0.2	0.0	0.0
3	78.3	18.5	2.7	0.4	0.1
4	86.1	7.7	3.1	1.1	2.0
5	16.6	77.4	4.6	1.1	0.3
Average	43.9	51.3	3.6	0.9	0.3

Table 7. Current defoliation caused by various insects and diseases in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various defoliation categories(%)				
	Negative 0%	Trace 1-5 %	Light 6-29%	Moderate 30-70%	Severe 71-100%
Pine					
1	91.5	8.0	0.4	0.0	0.1
2	81.8	18.2	0.0	0.0	0.0
3	78.2	17.9	2.2	1.2	0.5
4	84.6	14.1	0.9	0.4	0.0
5	51.2	48.8	0.0	0.0	0.0
Average	79.1	19.4	0.9	0.4	0.2
Spruce					
1	83.0	16.6	0.3	0.0	0.1
2	74.2	25.6	0.2	0.0	0.0
3	76.5	21.0	2.3	0.2	0.0
4	70.0	27.8	2.2	0.0	0.0
5	27.1	69.3	3.3	0.3	0.0
Average	47.3	50.0	2.5	0.2	<0.1

Table 8. Total defoliation caused by various insects and diseases in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various defoliation categories(%)				
	Negative 0%	Trace 1-5 %	Light 6-29%	Moderate 30-70%	Severe 71-100%
Pine					
1	96.3	3.2	0.5	0.0	0.0
2	81.8	18.0	0.0	0.2	0.0
3	57.8	24.0	7.3	8.4	2.5
4	82.5	16.2	0.9	0.4	0.0
5	22.2	77.1	0.5	0.2	0.0
Average	69.4	24.5	2.6	2.7	0.8
Spruce					
1	83.0	14.9	1.4	0.5	0.2
2	74.9	24.4	0.7	0.0	0.0
3	74.7	18.5	5.7	1.0	0.1
4	80.2	18.2	1.4	0.2	0.0
5	18.3	77.7	3.0	0.7	0.3
Average	42.4	53.8	2.9	0.7	0.2

Table 9. The condition of leaders in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees with leaders in various condition categories(%)			
	Healthy	Damaged	Multiple	Dead
Pine				
1	91.9	6.7	3.5	1.1
2	96.0	4.0	3.1	0.7
3	88.2	4.2	10.1	2.4
4	85.9	5.8	15.3	2.2
5	84.0	7.0	18.0	0.4
Average	89.5	5.4	9.2	1.5
Spruce				
1	80.1	14.6	6.9	0.8
2	86.9	13.0	7.6	0.2
3	85.8	9.6	2.1	3.9
4	91.7	6.1	18.1	0.9
5	75.6	13.1	22.7	0.9
Average	79.5	12.5	16.5	1.2

Table 10. The condition of branches and shoots in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees in various condition categories(%)				
	Healthy Branches	Damaged Shoots	Dead Shoots	Damaged Branches	Dead Branches
Pine					
1	92.0	3.7	1.2	3.6	0.1
2	98.7	0.7	0.2	0.2	0.2
3	81.0	3.0	1.9	13.0	2.3
4	87.7	8.8	0.7	4.9	1.8
5	95.4	0.2	0.2	4.4	0.9
Average	89.6	3.2	1.0	6.2	1.6
Spruce					
1	88.0	8.8	0.6	1.9	0.8
2	97.8	2.2	0.0	11.6	0.2
3	78.7	16.6	2.7	6.2	0.5
4	88.9	8.9	2.2	5.2	0.4
5	92.7	4.8	0.2	2.0	0.3
Average	90.3	7.0	0.6	3.3	0.4

Table 11. The condition of buds in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees with buds in various condition categories(%)	
	Healthy	Damaged
Pine		
1	99.3	0.7
2	99.6	0.4
3	97.9	2.1
4	99.1	0.9
5	98.2	1.8
Average	98.8	1.2
Spruce		
1	89.8	10.2
2	92.2	7.8
3	84.2	15.8
4	93.7	6.3
5	87.0	13.0
Average	87.8	12.2

Table 12. The condition of stems in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees with stems in various condition categories(%)		
	Healthy	Damaged	Dead
Pine			
1	97.7	2.0	0.3
2	96.7	2.6	0.7
3	90.2	7.8	2.0
4	95.3	4.2	0.5
5	90.9	6.9	2.2
Average	93.9	4.9	1.2
Spruce			
1	97.9	1.3	0.8
2	92.5	7.3	0.2
3	98.1	0.7	1.2
4	95.6	3.1	1.3
5	95.9	0.7	3.4
Average	96.2	1.4	2.4

Table 13. The condition of roots in pine and spruce plantations in N.B. in 1986

NBDNRE Region	Trees with roots in various condition categories(%)	
	Healthy	Damaged
Pine		
1	99.7	0.3
2	99.3	0.7
3	97.7	2.3
4	98.0	2.0
5	97.8	2.2
Average	98.5	1.5
Spruce		
1	99.2	0.8
2	99.8	0.2
3	98.7	1.3
4	96.4	3.6
5	96.5	3.5
Average	97.4	2.6

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